

Land Cover/Land Cover Change

Product Description

This Level 3 product contains land cover type (Param. 2669) and land cover change (2761) parameters which will be produced at 1-km resolution on a quarterly basis beginning 18 months following launch of the AM-1 platform. The land cover parameter identifies 17 categories of land cover following the IGBP global vegetation database, which defines nine classes of natural vegetation, three classes of developed lands, two classes of mosaic lands and three classes of nonvegetated lands (snow/ice, bare soil/rocks, water.) The land cover change parameter quantifies subtle and progressive land-surface transformations as well as major rapid changes. As such, it is not a conventional change product that only compares changes in land cover type at two times but combines analyses of change in multispectral-multitemporal data vectors with models of vegetation change mechanisms to recognize both the type of change and its intensity. In addition to the basic 1-km product, summary products containing proportions of land covers and change characteristics will be available at one-quarter, one-half, and 1° resolutions.

Research & Applications

This product is used for biophysical and biogeochemical parameterization of land cover for input to global and regional scale models of climate, hydrologic processes, and biogeochemical cycling. Examples of biogeophysical parameters keyed to land cover include leaf area index, vegetation density, and FPAR. Other parameters are biomass permanence and energy transfer characteristics of the land surface.

Data Set Evolution

Recent attempts to produce regional scale land cover datasets use coarse spatial resolution, high temporal frequency data from the AVHRR instrument aboard the NOAA series of meteorological satellites. Most of these efforts have used the Normalized Difference Vegetation Index (NDVI) parameter derived from this data. The NDVI generally quantifies the biophysical activity of the land surface and as such does not provide land cover directly. The MODIS

land cover algorithm draws from information domains well beyond those used in these efforts including directional surface reflectance, texture, vegetation index, acquisition geometry, land surface temperature, and snow/ice cover. The algorithm will rely on a neural network approach to classification as this method has been shown to outperform conventional supervised classifiers such as maximum likelihood. Product validation will be based on a network of test sites chosen to represent major global biomes and cover types. High resolution imagery (e.g., Landsat) will be used to establish truth for the sites which will be used post-launch to train the land cover classifier and validate the products. The validation procedure will characterize the accuracy of the product as well as provide information that can be used in spatial aggregation to provide land cover and land cover change data at coarser resolutions.

MOD 12 PRODUCT SUMMARY

Coverage:

global, land only

Spatial/Temporal Characteristics:

1 km, 1/4°, seasonal

Key Science Applications:

biogeochemical cycles, land cover change

Key Geophysical Parameters:

land cover type, land cover change

Processing Level:

3

Product Type:

standard, at launch

Science Team Contact:

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Suggested Reading

Lambin, E.F. and A.H. Strahler, 1994.

Lambin, E.F. and A.H. Strahler, 1994.

Moody, A., *et al.*, 1994.

Nemani, R.R. and S.W. Running, 1995.

Running, S.W., *et al.*, 1994.

Running, S.W., *et al.*, 1995.

Strahler, A., *et al.*, 1995.

Townshend, J.R.G., *et al.*, 1991.

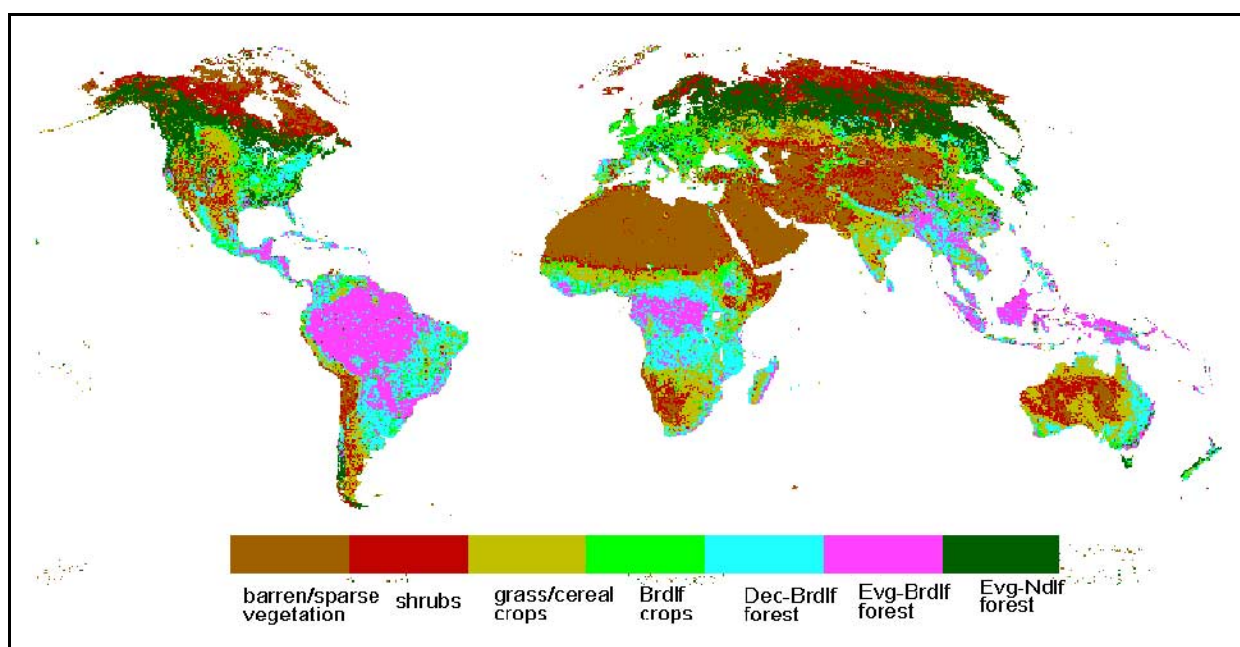


Figure 33. Global Distribution of the Six Canopy Structure Based Vegetation Classes Required for Carbon, Water and Climate Modeling, Derived from AVHRR Pathfinder Data.